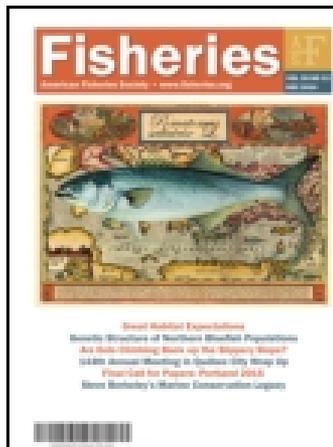


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Publisher: Taylor & Francis

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Fisheries

Publication details, including instructions for authors and subscription information:
<http://www.tandfonline.com/loi/ufsh20>

The 2003 Québec Declaration of Concern About Eel Declines—11 Years Later: Are Eels Climbing Back up the Slippery Slope?

Willem Dekker (coordinator)^a & John M. Casselman (coordinator)^b

^a Swedish University of Agricultural Sciences, Department of Aquatic Resources, Stångholmsvägen 2, SE - 17893 Drottningholm, Sweden. E-mail:

^b Department of Biology, Queen's University, 2406 Biosciences Complex, 116 Barrie St., Kingston, ON, Canada K7L 3N6. E-mail:

Published online: 16 Dec 2014.



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To cite this article: Willem Dekker (coordinator) & John M. Casselman (coordinator) (2014) The 2003 Québec Declaration of Concern About Eel Declines—11 Years Later: Are Eels Climbing Back up the Slippery Slope?, *Fisheries*, 39:12, 613-614, DOI: [10.1080/03632415.2014.979342](https://doi.org/10.1080/03632415.2014.979342)

To link to this article: <http://dx.doi.org/10.1080/03632415.2014.979342>

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Willem Dekker (coordinator)

Swedish University of Agricultural Sciences, Department of Aquatic Resources, Stångholmsvägen 2, SE - 17893 Drottningholm, Sweden. E-mail: willem.dekker@slu.se

John M. Casselman (coordinator)

Department of Biology, Queen's University, 2406 Biosciences Complex, 116 Barrie St., Kingston, ON, Canada K7L 3N6. E-mail: john.casselman@queensu.ca

In 2003, scientists gathered at the American Fisheries Society meeting in Québec and raised an urgent alarm in a Declaration of Concern about the state of eel stocks around the world, with less than 1% of juvenile resources remaining (as documented for northern temperate stocks). In the years since, precautionary protective measures have been implemented, monitoring and research have increased, and sustainable management methods have been developed. Recently, several juvenile resources have increased slightly. Reassembled in Québec in 2014, we reflect on what has been achieved since 2003 and what remains to be done.

Eels are enigmatic animals. These fishes of the family Anguillidae are commonly known as freshwater eels, although they also occur in coastal areas and reproduce in the open ocean. Despite decades of scientific research, crucial aspects of their biology remain a mystery. In recent decades, the numbers of young eels recruiting from the oceans into estuaries and rivers have rapidly diminished. In Europe, recruitment has declined by 90%–99% since 1980. In North America, recruitment to the upper St. Lawrence River, near the species' northern limit, has virtually ceased, though other areas closer to the spawning area have shown similar, weaker, or no trends in recruitment. In Japan, the decline since 1970 was about 80%. For other eel species, though less information is available, there are some indications of declines too. On all continents, the times when almost every natural water body contained eels and cultural feasts were organized during mass eel migrations are still within living memory.

The causes of the decline are unclear. Global oceanic changes, as well as direct and indirect impacts (barriers to migration, contaminants, fisheries exploitation, habitat loss, parasite introductions, and water quality deterioration), have been suggested. As yet, no conclusive evidence exists, in part because of the long distances these fishes migrate to reproduce. The numbers of eels that successfully complete the long migration to their spawn-

ing areas in distant oceans have never been assessed directly. This is in distinct contrast to the situation for other fish species, where safeguarding a minimal spawning biomass is at the heart of stock protection. In 2003, we therefore argued for precautionary protection. A demise of eel resources would represent a severe reduction in biodiversity and a significant loss for the communities where eel fishing is still of economical or cultural significance.

Since 2003, the distressing situation of eel stocks has attracted broad attention—in science, media, and educational programs and among managers and decision makers. Since then, monitoring of major eel stocks around the world has improved and research has advanced considerably, as evidenced by our return to Québec in 2014 for the largest ever eel symposium. All *Anguilla* species have now been considered for or listed on

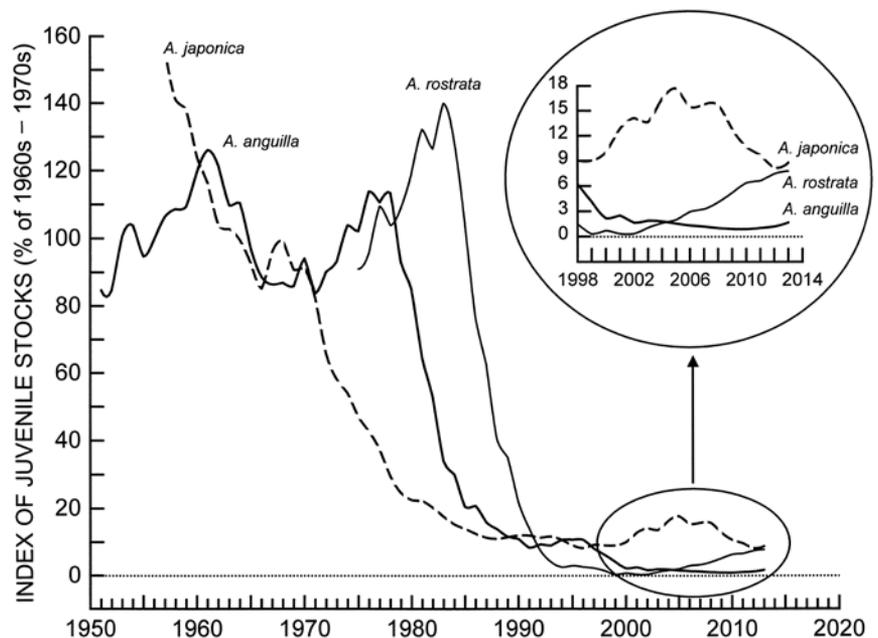


Figure 1. Time trends in abundance of major juvenile eel stocks of the world. From the 2003 Québec Declaration of Concern (Dekker et al. 2003), updated: European eel (*Anguilla anguilla*), glass eels, geometric means of available local series from the International Council for the Exploration of the Sea—Working Group on Eels, provided by C. Briand; American Eel (*A. rostrata*), small yellow eels ascending upper St. Lawrence River, from Lake Ontario Management Unit, Ontario Ministry of Natural Resources, provided by J. Casselman; Japanese eel (*A. japonica*), glass eel catches in Japan, from Statistics Bureau, Ministry of Internal Affairs and Communications (prior to 1977 may include young eels larger than glass eels), after 2003 obtained from Fisheries Agency, Japan, provided by K. Tsukamoto. Illustrated using 5-year running means with end-point contractions. Figure prepared by L. Marcogliese.

the International Union for Conservation of Nature Red List. Considerable progress is being made in the design and implementation of management schemes that fit the particularities of eels (including derivation of minimal protection levels, recovery strategies, and stock assessment methodologies; partitioning of responsibilities among international, national, and regional authorities; international coordination between divergent areas; and national and international governance). In Europe, international integration of eel protection is underway, and elsewhere tentative steps have been taken. Indigenous communities and stakeholders around the world have expressed their concerns and have increasingly become involved in policy development and implementation.

An increase in recruitment has been observed in Europe and parts of North America for several years in a row, and the trend in East Asia has fluctuated (Figure 1)—though the actual numbers are still very far below what was commonly observed in the past. It is unclear to what extent these upturns relate to recent protective actions. Regardless, the increased numbers will still contribute to recovery if properly protected.

Recovery of the stocks will require that current protection is maintained or increased and that management plans are expanded (stepwise) to as yet unprotected areas. Further technical development and implementation of management schemes will be essential to ensure that protection achieves the minimal level required for recovery and to achieve stock-wide coordination and good governance for each species.

Each year, as we wait eagerly to find out how many young eels will arrive from the ocean, the future remains as unpredictable as ever. But the recent recruitment increase of some stocks and the relative stability of others indicate that, after many decades of continued decline, depleted eel stocks around the world have the potential to recover. Now is the time to ensure that all stocks are adequately protected throughout their range; now is the time to collaborate on integrated stock-wide management.

Québec City, 21 August 2014. Undersigned by:

- For researchers of European eel:
Willem Dekker
willem.dekker@slu.se
- For researchers of American eel:
John M. Casselman
john.casselman@queensu.ca
- For researchers of Japanese eel:
Katsumi Tsukamoto
tsukamoto.katsumi@nihon-u.ac.jp
- For researchers of New Zealand eels:
Jacques Boubée
jacques.boubee@niwa.co.nz
- For researchers of tropical eel species:
Shun Watanabe
watanabe.shun@nihon-u.ac.jp
- For Maori communities involved with eels:
Doug Jones
doug.jones@teohu.maori.nz

- For First Nations involved with American eel:
Konrad Sioui, Grand Chief of the Huron-Wendat Nation

Following the plenary discussion at the end of the International Eel Symposium 2014, this Declaration was prepared by a group of volunteers: Willem Dekker, John Casselman, Laurent Beaulaton, Jacques Boubée, David Cairns, Martin Castonguay, Sheila Eyler, Eric Feunteun, Matthew Gollock, Reinhold Hanel, Courtney Holden, Brian Jessop, Doug Jones, Michael Miller, Katsumi Tsukamoto, Alan Walker, Shun Watanabe, and Håkan Wickström.

The following participants of the plenary discussion, in alphabetical order by country and name, approved this Declaration:

- Algonquin: L. McDermott
- Canada: B. Boivin, C. Burliuk, D. K. Cairns, G. Carey, Y. Carey, J. M. Casselman, M. Castonguay, D. Eyland-Reiss, D. Hatin, C. Holden, B. Jessop, N. Langlois, L. A. Marcogliese, A. Mathers, D. Meerburg, J. Nguyen, T. Pratt, T. Stewart, G. Verreault
- Denmark: M. I. Pedersen
- Estonia: P. Bernotas, A. Järvalt
- France: L. Beaulaton, C. Boisneau, H. Drouineau, E. Feunteun, P. Lambert
- Germany: U. Brämick, R. Hanel, L. Marohn
- Japan: M. J. Miller, K. Tsukamoto, S. Watanabe
- Maori: A. Gordon, D. Jones, M. Kearney
- New Zealand: J. Boubée
- Norway: C. Durif
- Spain: A. Aranburu, E. Diaz
- Sweden: E. Björkvik, W. Dekker, A. Silfvergrip, H. Wickström
- Taiwan: W.-N. Tzeng
- Tunisia: E. Derouiche
- United Kingdom: M. Gollock, A. Walker
- United States: E. Aalto, C. Bowser, G. Burns, B. Chase, M. Draghetti, S. Eyler, J. Johnson, L. Lee, A. Lisi, J. D. McCleave, S. J. Mount, K. Oliveira, J. Quinn, S. Schlueter, L. Sullivan, S. Welsh, J. L. Withers, G. Zydlewski

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SUGGESTED CITATION FOR THIS DECLARATION

Dekker, W., and J. M. Casselman (coordinators). 2014. The 2003 Québec Declaration of Concern About Eel Declines—11 Years Later: Are Eels Climbing Back up the Slippery Slope? *Fisheries* 39(12): 613-614. 

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